WHAT IS CLAIMED IS:

1. A method for forming at least one opening in an insulating layer on a substrate while depositing a barrier layer on side walls of the opening without essentially depositing the barrier layer on a bottom of the opening, the method comprising the steps of:

subjecting the substrate to a plasma, the plasma being generated in a gaseous mixture comprising at least three components, the components comprising a first component for depositing the metal barrier layer on at least the side walls of the opening, a second component for forming an opening in the insulating layer, and a third component for removing the barrier layer being formed on the bottom of the opening;

etching the insulating layer with the plasma; and

depositing the barrier layer on the side walls of the opening with the plasma.

2. A method as recited in claim 1, wherein the first component is selected from the group consisting of 1-methyl silane, 2-methyl silane, 3-methyl silane, 4-methyl-silane, a mixture of SiH4 and N_2, a mixture of WF_6 and N_2, and combinations thereof.

3. A method as recited in claim 1 wherein the second component is selected from the group consisting of N_xO_y, $C_xF_yH_xO_u$, N_2/O_2 mixtures, N_2/H_2 mixtures, O_2, O_3, NH_3, CO, CO_2, CH_4, and combinations thereof.

4. A method as recited in claim 1, wherein the third component comprises a chemical compound that forms a halogen ion or a radical in the plasma.

5. A method as recited in claim 4, wherein the third component is selected from the group consisting of NF_3, SF_6, F_2, ClF_3, and mixtures thereof.

6. A method as recited in claim 1, wherein the gaseous mixture further comprises an inert gas.

7. A method as recited in claim 1, wherein the plasma is a continuous plasma.

8. A method as recited in claim 1, wherein the plasma is a pulsed plasma.

9. A method as recited in claim 1, wherein the barrier layer is a metal diffusion barrier layer.

10. A method as recited in claim 9, wherein the barrier layer comprises silicon carbide.

11. A method as recited in claim 1, wherein the insulating layer comprises a porous material.

12. A method as recited in claim 1, wherein the insulating layer is an organic containing insulating layer.

13. A method as recited in claim 1, wherein the insulating layer is an inorganic containing insulating layer.

14. A method as recited in claim 1, wherein the opening is a via hole, the via hole extending through the insulating layer to an underlying conductive layer or to an underlying barrier layer.

15. A method as recited in claim 1, further comprising the steps of:

covering the insulating layer with a bilayer, the bilayer comprising a resist hard mask layer formed on the insulating layer and a resist layer formed on the hard mask layer; and

patterning the bilayer.

16. A device comprising an insulating layer on a substrate, the insulating layer having an opening, wherein side walls of the opening are covered with a barrier layer and a bottom of the opening is essentially not covered with the barrier layer, characterized in that the device is produced by a method comprising the steps of:

subjecting the substrate to a plasma, wherein the plasma is generated in a gaseous mixture comprising at least three components, the components comprising: a first component for depositing the metal barrier layer on at least the side walls of the opening, a second component for forming an opening in the insulating layer, and a third component for removing the barrier layer formed on the bottom of the opening;

etching the insulating layer with the plasma; and

depositing the barrier layer on the side walls of the opening with the plasma.

17. A device as recited in claim 16, wherein the first component is selected from the group consisting of 1-methyl silane, 2-methyl silane, 3-methyl silane, 4-methyl-silane, a mixture of SiH_4 and N_2, and mixtures thereof.

18. A device as recited in claim 16, wherein the second component is selected from the group consisting of N_xO_y, $C_xF_yH_xO_u$, N_2/O_2 mixtures, N_2/H_2 mixtures, O_2, O_3, and mixtures thereof.

19. A device as recited in claim 16, wherein the third component comprises a chemical compound that forms a halogen ion or a radical in the plasma.

20. A device as recited in claim 19, wherein the third component is selected from the group consisting of NF_3, SF_6, F_2, ClF_3, and mixtures thereof.

21. A device as recited in claim 16, wherein the gaseous mixture further comprises an inert gas.

22. A device as recited in claim 16, wherein the plasma is a continuous plasma.

23. A device as recited in claim 16, wherein the plasma is a pulsed plasma.

24. A device as recited in claim 16, wherein the barrier layer is a metal diffusion barrier layer.

25. A device as recited in claim 24, wherein the barrier layer comprises silicon carbide.

26. A device as recited in claim 16, wherein the insulating layer comprises a porous material.

27. A device as recited in claim 16, wherein the insulating is an organic containing insulating layer.

28. A device as recited in claim 16, wherein the insulating layer is an inorganic containing insulating layer.

29. A device as recited in claim 16, wherein the opening is a via hole, the via hole extending through the insulating layer to an underlying conductive layer or an underlying barrier layer.

30. A device as recited in claim 16, the method for producing the device further comprising the steps of:

covering the insulating layer with a bilayer, the bilayer comprising a resist hard mask layer formed on the insulating layer and a resist layer formed on the hard mask layer; and

patterning the bilayer.

31. A gaseous mixture for use in a method for forming at least one opening in an insulating layer on a substrate while depositing a barrier layer on side walls of the opening without essentially depositing the barrier layer on a bottom of the opening, wherein a plasma is generated from the gaseous mixture, and wherein the gaseous mixture comprises a first component, a second component, and a third component, wherein the first component deposits a barrier layer on the side wall of the opening, wherein the second component forms the opening in the insulating layer, and wherein the third component removes the barrier layer formed on the bottom of the opening.

32. The gaseous mixture as recited in claim 31, wherein the first component is selected from the group consisting of 1-methyl silane, 2-methyl silane, 3-methyl silane, 4-methyl silane, a mixture of SiH_4 and N_2, a mixture of WF_6 and N_2, and mixtures thereof.

33. A mixture as recited in claim 31, wherein the second component is selected from the group consisting of N_xO_y, $C_xF_yH_xO_u$, N_2/O_2 mixtures, N_2/H_2 mixtures, O_2, O_3, NH_3, CO, CO_2, CH_4, and mixtures thereof.

34. A mixture as recited in claim 31, wherein the third component comprises a chemical compound that forms a halogen ion or a radical in the plasma.

35. A mixture as recited in claim 34, wherein the third component is selected from the group consisting of NF_3, SF_6, F_2, ClF_3, and mixtures thereof.

36. A mixture as recited in 31, wherein the gaseous mixture further comprises an inert gas.